



## *AVL System Proposal*

*Automatic Vehicle Location System,*

*On behalf of:*

# **The City of Rochester, New York**

### **Fleet Tracking Global Positioning System**

**Date**

**August 3, 2012**

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## 3.1 Executive Summary

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CompassCom Software Corp (CompassCom) specializes in the integration of Automatic Vehicle Location (AVL) systems. Our overall AVL solution allows commercial-off-the-shelf (COTS) hardware, wireless connectivity components, and mapping software and is proven to work reliably, with a long track record of success. CompassCom proposes an enterprise level Automatic Vehicle Location software solution as a Common Operating Picture to serve the City of Rochester. CompassCom can provide an in-house solution or a CompassCom hosted solution. The CompassCom solution can be expanded for software growth and wireless modem hardware additions for cellular, WiFi, Satellite or Motorola Astro<sup>®</sup> use.

CompassCom has designed our system architecture to easily adapt to third-party hardware and software, now and into the future. The CompassCom AVL server Location Data Engine (LDE) is the destination of all position status and messaging data originating from AVL-equipped vehicles. CompassCom provides CompassTrac as a viewing product that incorporates your GIS maps (Esri ArcGIS<sup>®</sup> or some other mapping product) to show real-time mobile asset locations on your desktop monitors, or even on mobile laptops, in a completely scalable yet secure program. If the City of Rochester uses work order management or asset management that includes a viewer, CompassCom can interface to that software as well.

Within the Technical Summary, below, are specifications for an installation that includes all items to operate in a stand-alone environment, including the ability for future expansion into different departments, third party software, Centralized Dispatch systems, 911 systems, database applications, rideshare applications, or any other software that you may want to include in your mobile resource enterprise system.

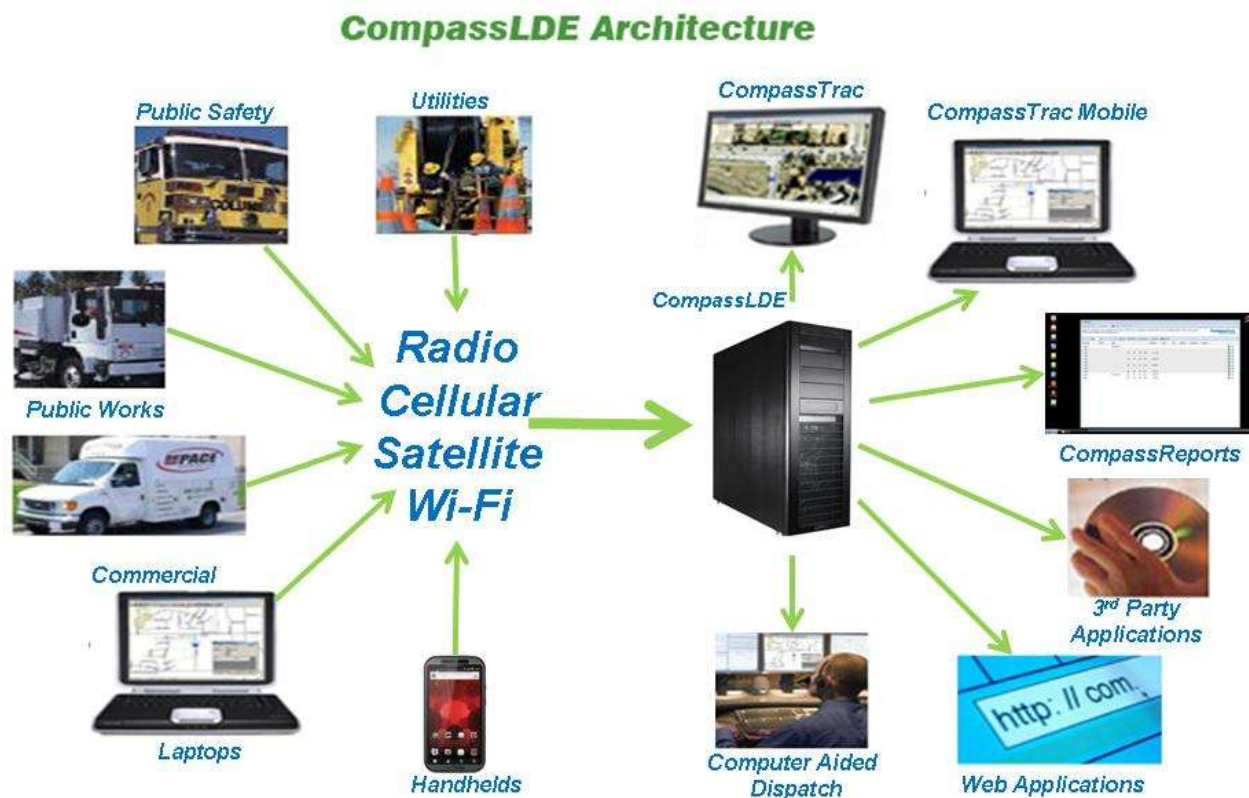
CompassCom developed our first generation software in the 1990's to meet the market demand for a system that met vehicle tracking needs while including the flexibility to expand and keep up with changing technology. Over the years CompassCom has continually updated and remained state-of-the-art. Our product incorporates the latest in GPS and wireless technology with our AVL software to allow fleet managers to track the position of their mobile assets in real-time, reducing cost and increasing safety. Although our solution is continually updated, the AVL system proposed by CompassCom has the same basic software architecture as the client-server configuration we created for the 2002 Olympic Games in Salt Lake City and that is currently being used by tens of thousands of vehicles nationwide.

The CompassCom AVL solution is comprised of the primary elements described below (Figure 1)

- **LDE AVL Server Software:** The CompassLDE® software allows the City of Rochester to share AVL data with any connected client terminal via the TCP/IP protocol. CompassLDE server software is able to interface with virtually any type of hardware in any combination using any type of wireless format. It is also able to share this information not just among our clients, but also many third party software systems, such as Computer Aided Dispatch, Work-Order systems, other AVL systems, and even small scale or legacy software systems. CompassLDE is a message switch along with a data switch, allowing the dispatcher to communicate directly or through third party solutions. So, CompassLDE® provides a full enterprise solution.
- **AVL Workstation Software:** CompassTrac® client software gives the City of Rochester an Esri-based AVL mapping package that shows the real-time (and historical) position of all vehicles in a dispatch environment. However, security is also built in, as through CompassTrac the user can see only the vehicles for which he/she is authorized. CompassTrac is a very powerful tool that gives the manager/dispatcher full management control. Each CompassTrac license also gives direct access to our full suite of reports offered by CompassReports™.

Each of the above components will be described in detail in the following sections of this document.

**Figure 1:** CompassLDE® Inputs and Outputs:



## 3.2.1 Company Description

CompassCom Software Corporation (Fed ID # 30-0352070), is a Woman-Owned Small Business, private Colorado Corporation founded in 1994. The CompassCom corporate office is located in Centennial, Colorado. The company was founded to provide solutions for the challenge of managing mobile resources. The evolution and maturing of GIS mapping, wireless communications, GPS and mobile data communications and computing systems allows for today's solutions to improve fleet efficiency, save time, provide outstanding Return On Investment, and improve safety.

CompassCom provides solutions for Geographic Information System (GIS) technology and Mobile Resource Management (AVL, M2M, telematics) applications. Integration of Global Positioning Systems (GPS), Computer Systems, Mobile Data Communications (MDC) and Wireless Communication are the foundation of these solutions.

### Management Philosophy

CompassCom's management philosophy is to encourage organizational growth and prosperity. We provide a pleasant and organized work environment with the resources necessary for our staff to develop professional excellence. CompassCom strives to meet high ethical standards in our business practices with our customers, vendors, employees, and the community.

CompassCom is committed to equal opportunity without regard to age, color, race, disability, national origin, religion, sex, national origin, sexual orientation, ethnic group or veteran disability. The company is committed to providing its employees with the best possible work environment. The company fosters respect and honesty toward its customers, associates and employees, and strives to maintain a high level of ethics in its business practices. Consistent with applicable federal, state and local laws, the company prohibits any form of racial, ethnic, religious, national origin or sexual harassment or discrimination of an employee by any person.

### Qualifications

CompassCom develops its own software portfolio of Mobile Resource Management applications. We are a certified solution provider for Esri<sup>®</sup>, Motorola<sup>®</sup>, Trimble<sup>®</sup>, Azteca Cityworks<sup>®</sup>, Sierra Wireless<sup>®</sup>, CalAmp<sup>®</sup>, Quake<sup>®</sup>, GlobalStar<sup>®</sup>, Prova Systems<sup>®</sup>, Data Limited<sup>®</sup>, iTronix<sup>®</sup>. Markets include:

State and Local Government	Federal Government
Public Works Agencies	Public Safety
Education	Utilities – Water, Storm water
Utilities – Electric & Gas	Service Providers – Telecom & Cable
Transportation – Shuttles, Trucks, Aviation	Engineering, Environment & GIS companies
Energy – Oil & Gas, Mining	Industrial fleets & machines
Transportation – Trucking, Rail	Aviation Industry
Field Service	Engineering & Environmental

## CompassCom Solution Value and Benefits

CompassCom Software develops and integrates Automatic Vehicle Location (AVL) solutions to enable customers to use location-based data for fleets and mobile assets. Our solution is based on Esri ArcGIS 10 and includes detailed analytical reports provided through CompassReports. We integrate our software with any standard wireless hardware and GPS and provide the flexibility to work with the customers' existing GIS data, wireless and IT database.

### Value Proposition:

- Real time tracking of mobile operations for customer service and accountability
- Cost reductions through operations monitoring, route management and compliance
- Mitigate personnel safety and security risks

### Solution Benefit Overview:

- Open architecture with standard API for browser-based development or 3rd party client
- Client Server or architecture, providing desktop and web-based mobile solution
- Supports SQL, Oracle and other standard databases for archiving historical data
- GIS support with a flexible leveraging of customer investment in Esri or other mapping applications and services
- Tracks vehicles on GIS data such as Esri ArcGIS or commercially available digital maps
- Interoperability and communication flexibility - cellular, WiFi, zigbee, radio, satellite
- Modem independent: CalAmp, Sierra, Quake, Axxon, or other
- Custom Reports with alerts – idle time, emissions, mileage and maintenance, etc (ROI)
- Open architecture allows for creation of customized reports with XML data
- Accounting, Mobile Work Force interface for B.A.A.N., Maximo, CityWorks, etc.
- Displays vehicle position, speed, heading and status in real-time and historical data
- Replays vehicle activity, locates addresses, creates and monitors geo-fences, allows placemarks
- Discrete I/O interfaces for PTO engaged, boom up/down, emergency or panic button, driver ID, lights-siren on/off, airbag, and others, including customized monitoring
- Options for two-way messaging, in-vehicle navigation, weather maps, mobile maps

### Government Public Works applications:

- Monitor performance & safety while dispatching to jobs based on true location and status
- Software interface & vehicle sensor for controllers of snowplows & weed-mosquito spray
- Interface to government web site for citizens to monitor the status of snow plows, sweepers, waste, and sprayers in their own neighborhoods, providing a tool for public information

### Government Public Safety applications;

- Real-time command & control – quick response time – interface to C.A.D.
- Communication interoperability & messaging across agencies using mobile data devices
- Link & view CAD drawings, floor plans, images to your existing GIS

**Alliances:** Esri, Motorola, Trimble, Raytheon, Azteca, Maximo, Cal Amp, Sierra, Quake



## **CompassCom Team**

### **Margaret J. Howard, Chair of the Board**

Margaret J. Howard co-founded CompassCom with W. Brant Howard in 1994. She maintains client/vendor relationships, and manages general financial and business operations for CompassCom. As Chair and Majority Owner, Margaret Howard provides corporate oversight and directions for the Board and management.

### **W. Brant Howard, Founder, CEO**

W Brant Howard co-founded CompassCom as a self-funded startup in 1994 and has grown it into three successful businesses based on GIS, GPS and wireless technology. Howard is the inventor of patented technology that has positioned CompassCom as an industry leader in the AVL industry, and has led with many industry firsts, including deploying the first Mobile Resource Management system for security for athletes at the Olympic Games in Salt Lake City in 2002.

Prior to being an entrepreneur, Howard was a hydrogeologist with the United States Geological Survey, Water Resources Division. He supervised well drilling and completion, pump tests and field inventory efforts.

Howard holds Bachelors and Masters degrees in Geology with a specialty in hydrology from Indiana University, Bloomington. Howard has been an adjunct faculty member at the University of Denver, teaching in the GIS certificate and Masters programs.

Howard makes numerous presentations for seminars and conferences around the world and has authored articles for technical journals on Geology, GIS and fleet management topics. Memberships include GITA, ASPRS, CSIA, APWA, APCO and MAPPS.

### **Brent Willing, President**

Brent Willing has more than 37 years of operational and systems management experience, including software development, multi-location data centers and multi-location call centers. Prior to joining CompassCom, Willing worked for American Express/First Data Corp for 33 years in a number of positions, including acquisitions and divestitures and the integration of IT functions and operational services of small to medium sized companies which involved the designing and consolidating of many business processes and practices to achieve profitability goals



**Kate Schlatter, COO**

As Chief Operating Officer, Kate Schlatter's principal responsibilities include project oversight, business and financial management for the Compass family of companies, including CompassCom, CompassData and CompassTools.

Schlatter holds a Bachelor of Science in Business Administration Organizational Management from Colorado State University.

**Michael Kovacs, Director of Sales**

Michael Kovacs is a 20-plus year sales management veteran of the data networking and wireless solutions industry. For CompassCom, he is responsible for North American sales of Mobile Resource Management and Automotive Vehicle Location solutions to industry verticals including state, local, and federal government agencies, utilities, oil and gas, mining and general commercial fleet operators.

Mr. Kovacs has previous senior sales experience with Intel-Xircom, Motorola, Omnipoint and AT&T Paradyne. He holds a degree from Ohio University.

**Brittney Clark, Project Manager**

Brittney Clark manages AVL project implementation, including ordering the appropriate hardware, managing installation and implementation phases, contract management, customer service, maintenance and warranty service. She has more than five years' experience in project management with CompassCom, handling implementation projects for customers with fleets of all sizes. Clark holds a Master's Degree in Organizational Leadership from the University of Denver and a Bachelor of Arts in Sociology from Colorado State University.

**Brent Petersen, Lead Software Engineer**

Brent Petersen serves as Lead Software Engineer for CompassCom's software development team, providing technical direction for the development staff and ensuring that CompassCom's software products are meeting and exceeding client expectations. Brent has over 20 years of technical experience in telecommunications, application development, and GIS software solutions. He holds a Bachelor's degree in Electrical Engineering and a Master's in Computer Information Systems.

**Ian McIntyre, Product Development Associate**

As the Software Application Engineer, Ian McIntyre provides technical customer service for CompassCom clients. McIntyre duties include customizing the AVL program as needed; remotely supporting end-users; managing customer subscription and application data; software design and development; performing on-site and remote trainings; and establishing the AVL data stream across various networks. McIntyre holds a Bachelor of Science in Advertising from University Michigan State and a Masters degree in Urban Planning from University Colorado Denver.

### 3.2.2 Vendor Information

Question	Vendor Response
Official Name of Company	CompassCom Software, Inc
Headquarters' Address	12353 East Easter
Telephone Number	303-680-3311
Fax Number	888-766-2488
Federal Tax ID Number	
Names under which the business has operated within the last 10 years.	Same name
Contact Name for questions concerning RFP response.	Michael Kovacs
Contact's Telephone Number	303-912-1940
Contact's e-mail address	mgkovacs@compasscom.com
Is company authorized and/or licensed to do business in the State of New York?	YES
Does your company have an office in the City of Rochester or County of Monroe?	NO, CompassCom is partnering with Bergmann & Associates who has Corporate Headquarters in Rochester, New York
Company Ownership	<b>Private</b>
If Private, list primary owners and their percentage ownership.	Maggie Howard, majority
If Public, list stock trading symbol and market which it is traded.	
Has corporate ownership changed in the last 5 years? If so, provide details.	NO
Has the company purchased any other companies or divisions of companies in the last 5 years? If so, provide details.	NO
Has the company or any of its principals defaulted on any municipal contracts in the past 5 years? If so, provide details.	NO
Please provide details on any lawsuits involving the company that are currently pending or occurred in the past 5 years.	No lawsuits
Has your company ever been declared bankrupt or filed for protection from creditors under state or federal proceedings? If so, state the date, court, jurisdiction, amount of liabilities and amount of assets.	NO
Is your Company currently on the approved NYS Contract list? If yes, identify contract services.	NO, Bergmann & Associates is on the NYS Contract list

### 3.2.3 References

**Saginaw County, MI, Road Commission (customer since 2007)**

3020 Sheridan Ave,

Saginaw Michigan 48601

Tom Luck – Information Technology Manager

989-399-3778     [LuckT@Scrc-MI.org](mailto:LuckT@Scrc-MI.org)

Saginaw County public works Enterprise AVL deployment tracks 235+ vehicles. CompassCom has interfaced to their Certified Power & e-Poke snow plow spreader controllers.

**Lake County, IL (customer since 2010)**

600 West Winchester Road, Libertyville, Illinois 60048-1381

Kevin Kerrigan – Engineer of Maintenance

847-377-7498     [kkerrigan@lakecountyil.gov](mailto:kkerrigan@lakecountyil.gov)

Lake County public works department AVL deployment has 150+ vehicles tracked by CompassCom Hosted solution. They utilize Force America 5100's & Certified Power snow plow spreader controllers.

**City of Bloomington, MN (2010)**

1700 West 98<sup>th</sup>

Bloomington, MN 55431

Charlie Wild – Operations

952-563-4661     [cwild@ci.bloomington.mn.us](mailto:cwild@ci.bloomington.mn.us)

30 vehicles installed progressing to 200+; ESRI GIS integration; Force America 5100 spreader controller integration; AT&T Mobility network

**State of Wyoming DOT (customer since 2008)**

5300 Bishop Blvd

Cheyenne, Wyoming 82009-3340

Robert Wilson - Telecommunications

(307) 777 4212 [robert.wilson@dot.state.wy.us](mailto:robert.wilson@dot.state.wy.us)

Wyoming DOT uses CompassCom's AVL solution to track 500+ of the state fleet of Force America 5100 snow plows at this time though their Motorola radio network. They plan to add the remainder of state fleet vehicles. CompassCom is currently working with WDOT on Force America 6100 snow plow implementation.

**City of Durham, North Carolina Customer since 2008**

101 City Hall Plaza  
Durham, North Carolina 27701-3329

Marcus Bryant, GISP  
Technology Solutions/GIS  
919-560-4122 x 33249  
[Marcus.Bryant@durhamnc.gov](mailto:Marcus.Bryant@durhamnc.gov)

City of Durham Public Works and Public Safety use CompassCom AVL to monitor and control about 320 vehicles. Durham is an Esri ArcGIS 10 user and a Azteca Cityworks Server user who will be linking their real time AVL data into Cityworks in the fall 2012.

**City of Austin Texas (2008)**

Gary Allen

1006 Smith Rd., Austin TX 78721

(512) 927 3210 [Gary.allen@ci.austin.tx.us](mailto:Gary.allen@ci.austin.tx.us)

The city of Austin has an enterprise AVL system and is tracking 1000+ vehicles across multiple departments using private radio (Motorola) and cellular, including their Austin Energy Division.

**CompassCom Snow Operations Customers**

Wyoming DOT	Bloomington, MN	Saginaw County, MI	Akron, OH
Lake County, Ill	Thornton, CO	Douglas County, NE	Rock Island, Ill
Douglas County, CO	Omaha, NE	Pottawattimie County, IA	Loveland, CO
Arapahoe County, CO	Lincoln, NE	Newaygo County, MI	Aurora, CO
King County, WA	Fort Collins, CO	Newell County, Alberta	Oakville, Ont
Centennial, CO	TerraCare, CO		

**New Snow & Ice Operations customers 2012**

Massachusettes DOT	Council Bluffs, IA	Yellowhead County, Alberta	Banff, Alberta
Goshen County, WY	Integrated Services, CO		

### Snow & Ice Operations



- Personnel Safety
- Plow Up-Down with Time & Location stamp
- Controller On-Off with Time & Location stamp
- Controller interface – Material usage report
- Contractor billing
- Snow Reports
- Status Messages
- Weather
- Replay

### Truck Mounted AVL Components - sample

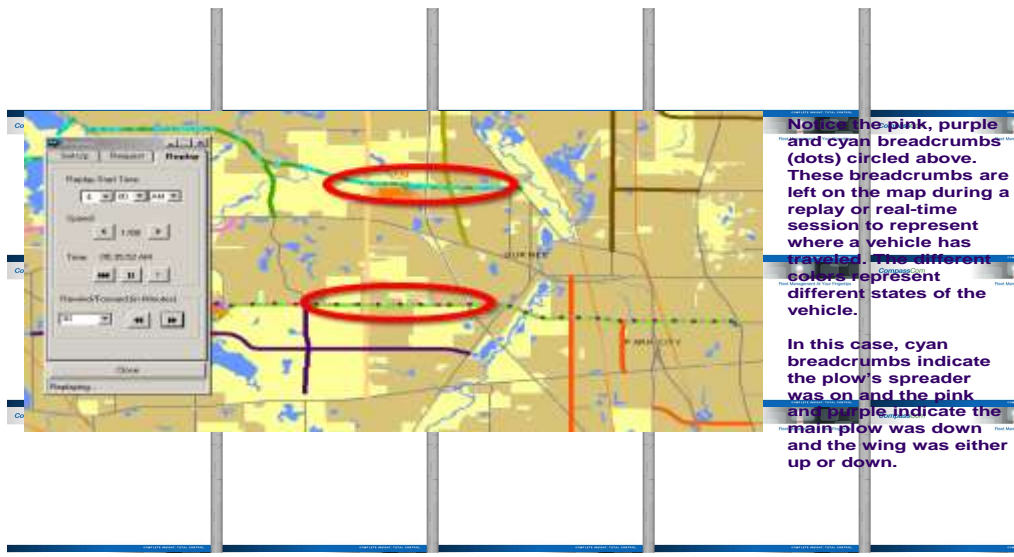


*Truck-mounted components of Saginaw County Road Commission's Automatic Vehicle Location (AVL) system.*

## CompassCom AVL - Enabling snow operations best practices

- **Geo-Fence**
  - Environmentally sensitive – lakes, rivers, reservoirs, etc
  - Zone or District – Time in/out; color code when done; status message
  - Priority Plow customers – Prioritize 1,2,3; snow routes; parking lots
- **Spotlight**
  - Individual plow vehicle – plowing/spreading – location & status
  - Specific location – heavy snow operations traffic
- **Route Management**
  - Efficiency – Use of color codes; Replay – historical view or training
  - Validation – What was plowed and when
  - Route & Vehicle – Display visual route – back tracking? Static route & vehicle?
  - Address – Reverse geo-code; geo-code
- **Reports**
  - Post processing – day/week/month; customize; dashboard
- **Spread Controller**
  - Spreader on/off – time & location
  - Material count – How much – overlay material to the route
    - Standard spread rate – 200 lbs./lanes; spreader to a lane;
    - Material count total for a day/week; Compare last storm - route & material
- **Temperature Air & Road**
  - Real time air & road temperature accessories – Road Watch, other
  - Historical data for audit trail
  - Weather forecast for liquid mix
- **Plow**
  - Time & location spent plowing – up/down plus time & location





## Additional CompassCom Public Works Applications



**Vehicle Arm Up/Down**

**PTO On/Off**

**Camera's On/Off**

**Status Messages**



### Storm Water & Streets



**P.T.O. on/off – time & location  
Status Messages**

**Broom up/down – time & location  
Status Messages**



### Customer Service – Field Crews

**Precise time & location status – vehicles & machines**



**Driver safety  
Status Messages**

- On Site
- In Route
- Project complete

**Real Time Routes**

**Project Management**

**Incident Management**

**Replay**

**Weather**

## 3.3 Detailed RFP Responses

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### 3.3.1 Assumptions

CompassCom has made the following assumptions regarding the RFP response.

Bergmann & Associates is our partner for third party integration, IT/GIS Services, services, local contact.

CompassCom architecture allows for API integration, third party interface, data export/import.

CompassCom is proposing a City of Rochester “in-house” software solution using AT&T GPRS service. CompassCom is happy to propose other wireless hardware for Verizon/Sprint network.

CompassCom price information is for Phase 1-3 implementation. We will price phase 1-6 if desired

### 3.3.2 CompassCom Advantages

- Experience with nationwide AVL deployments in State & local government
- Open architecture create foundation that is scalable, flexible and customizable
- GPS solution is real-time, hosted or in-house, desktop or mobile
- Communications flexibility to provide Cellular, Radio, WiFi, Zigbee and satellite
- Leverage GIS investment with CompassCom mapping experience & solution
- Leverage investment in asset management solution
- CompassReports provide detailed historical analysis allows for customized reports and dashboards
- Custom Report alerts on ROI issues – idle time, maintenance, mileage, emissions
- Replays individual vehicle activity, location addresses, allows user-defined place marks, creates and monitors geo-fences.

## Advantages - System Versatility

CompassLDE is the Mobile Resource Management (MRM) server software. CompassCom defines mobile resource management as Automatic Vehicle Location (AVL), Machine to Machine (M2M) and Telematics (engine diagnostics/fuel use, etc). CompassLDE is a Windows Server computer running the Location Data Engine (LDE) applications. In a cellular system, MRM messages are generated, packetized, and transmitted to a specific destination – CompassLDE. Upon receiving a message, the LDE extracts useful information (latitude, longitude, speed, heading, status, etc...) and serves it to all connected clients. The information is archived in either a SQL or Oracle database. CompassLDE is a high performance, real-time MRM server compatible with a multitude of devices and communication networks. CompassLDE is also scalable to any size fleet or mobile resource tracking need.

A primary differentiating factor between CompassLDE and other AVL solutions on the market today is the scalability and flexibility of the server software. For example, CompassLDE can

easily handle thousands of reporting vehicles and assets while also offering the ability to connect with multiple communication methods simultaneously. Therefore, if a customer has a public

Feature	Benefit
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safety department on a Motorola network, a bus fleet on private RF and a public works fleet on a spread spectrum, CompassLDE would operate seamlessly with all of the protocols and in-vehicle hardware configurations that are used. CompassLDE currently supports more than 30 distinct interfaces and this interoperability will allow the City of Rochester system to grow over time and expand as new technologies come on the market.

In addition, CompassLDE employs Patent Pending enhanced connection management features that help ensure wireless connectivity in areas of weak or spotty coverage. CompassLDE has the ability to output real time data as an XML feed to third party applications.

The CompassCom solution is designed to accommodate multiple departments within medium to large organizations. CompassLDE and CompassTrac have the ability to function within a wide variety of requirements over multiple departments with ease. For example, the discrete Input/Output feature is assigned the customers' function label for utility bucket, snow plow, street sweepers, sprayers, police & fire vehicles (on/off, up/down, open/closed, etc.). CompassReports can filter the differentiators automatically.

CompassTrac has the ability to display, in real-time, the current location and plowed areas for current storms through your Public View website. Saginaw County Road Commission and the City of Thornton, CO, are utilizing this feature. To view, Link to Saginaw - <http://www.scrmi.org/kiosk/>

CompassLDE has the ability to implement geo-fencing based on customized areas as well as sending alerts through CompassReports. CompassReports gives the location and time the unit entered or left the geo-fenced area as well as the time in question. The "alerts" function sends a message to a pre-determined location when an exception to an operation filter takes place. The alert could be sent to multiple devices or multiple people.

CompassReports is a web based product. It has the ability to provide a Dashboard report with maps filtered by fleet, group or individual asset. All collected field data is stored, and is available through CompassReports and the User defined Dashboard.

High Performance, Real Time, AVL Visualization	Knowing the real time location, status, and state of your fleet allows for better decision making when seconds count. Don't settle for slow, unresponsive map interfaces.
Run Time Mapping	Because the mapping interface is built upon ESRI's API in Silverlight 5, there has never been a more robust mapping interface for AVL. Nearly any datasource, web service, and map file can be rendered in CompassTrac. Customers can leverage their existing GIS investments.
CompassLDE API Compliance	CompassTrac is a complete client solution to the CompassLDE AVL server. GPS, Status, Sensors, 2-way messaging, 911 Incidents, Job Location, and Replay History are standard.
Advanced Fleet Visualization	Vehicle icons and "breadcrumbs" are configured by the customer to suit individual needs. Both vehicle icons and breadcrumbs can change color based on Vehicle Input states such as Plow Up/Down, Broom On/off, Ignition On/Off. This allows quick visual information as to the "state" of your fleet in real time or in play back. You won't have to waste time hunting for information.
Dynamic Maps	CompassTrac v5 allows for dynamic map changes using ArcGIS On Line web services.
Advanced Geocoding	Using online or local geocoding resources, CompassTrac can locate and plot addresses nearly anywhere. Quickly find a customer site or plot the location of a service call.
On Board Vehicle Sensor Integration	CompassTrac supports the display of sensor information to including On Board Vehicle Diagnostics, Snow Plow Spreader Controllers, and Vehicle Input sensors. This information is tied to real time and historical location for quick access.
Vehicle Routing	Compute a route from any vehicle to any location. This functionality can be used to ensure your drivers are able to reach their destination quickly and efficiently.
Data Grid	Visualize the entire fleet in a "spreadsheet" like grid. This is useful when monitoring for certain events such as speeding or idling.
Saved Map Extents	Users can zoom and pan to a specific location then save that extent for future use. Saved user extents allows quick navigation around the map.

**Strategic Direction**

**CompassTrac Version 5 – Web Services**

**3.3.3 Project Costs and Pricing Options Phase 1-3**

<b>Software: Customer hosted software</b>	<b>Unit Price</b>	<b>Total Price</b>
(1) CompassCom LDE Server Software	\$5,700.00	\$5,700.00
(230) CompassLDE Vehicle Licenses	\$180.00	\$41,400.00
(6) CompassTrac Client Viewing Application	\$895.00	\$5,370.00
(4) CompassTrac Mobile Viewing Application	\$540.00	\$2,160.00

**Software Sub Total** (First Year Maintenance included) **\$54,630.00**

**Software Maintenance:** (Year Two) **\$10,926.00**

**Software & Mapping set-up services**

(20) Engineering Services Hours – Map baseline, Admin, etc	\$125/hour	\$2,500.00
(25) Estimated Engineering Services Hours for third party integration -	\$125/hour	\$3,125.00

**Services Sub-Total:** **\$5,625.00**

<b>Hardware: GSM wireless modems with GPS</b>	<b>Unit Price</b>	<b>Total Price</b>
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**Phase I: Snow & Ice Control**

(50) LMU-2600/GPRS-GPS) (#LMU26G401-G1000)	\$126.00	\$6,300.00
(50) Roof Mount Antenna (#RM1353-TB-04)	\$45.00	\$2,250.00
(50) Standard Four Wire Fused Harness (5C867)	\$8.95	\$447.50
(50) LMU modem programming at CompassCom	\$50.00	\$2,500.00
(50) M-M Null modem cable	\$ 20.00	\$1,000.00
(1) Serial Programming Cable (#13337-5)	\$35.71	\$35.71
(50) Proximity Sensors – plow up/down	\$145.00	\$7,250.00

**Snow & Ice Hardware Sub Total** **\$19,783.21**

(50) **Installation estimate** – LMU-2600/ 2 hours; Proximity Sensor/ 1 hour = 3 hours/vehicle

Snow & Ice Installation Estimate (local third party): 150 hours @ \$100/hour    **\$15,000.00**

Hardware: GSM wireless modems with GPS		Unit Price	Total Price
<b>Phase 2 &amp; 3: Solid Waste &amp; Special Services</b>			
(180)	LMU-2600/GPRS-GPS) (#LMU26G401-G1000)	\$126.00	\$22,680.00
(180)	Roof Mount Antenna (#RM1353-TB-04)	\$45.00	\$8,100.00
(180)	Standard Four Wire Fused Harness (5C867)	\$8.95	\$1,611.00
(180)	LMU modem programming at CompassCom	\$50.00	\$9,000.00
(3)	Serial Programming Cable (#13337-5)	\$35.71	\$107.13
<b>Phase 2 &amp; 3 Hardware Sub Total</b>			<b>\$41,498.13</b>
(180)	Installation estimate: LMU-2600/2 hours =360 hours; \$100/hour X 360 =		<b>\$36,000.00</b>

## Solutions Sub Total & Totals

AVL Software	\$54,630.00
Software Maintenance – Year Two	\$10,926.00
Software Services	\$5,625.00
<b>Software, Maintenance (Yr 2) &amp; Services Sub Total:</b>	<b>\$71,181.00</b>
Snow & Ice Wireless modems/GPS hardware	\$19,783.21
Snow & Ice Hardware Installation (estimate)	\$15,000.00
Phase 2 & 3 Wireless modems/GPS hardware	\$41,498.13
Phase 2 & 3 Hardware Installation (estimate)	\$36,000.00
<b>Wireless Hardware &amp; Installation Services (estimate)</b>	<b>\$112,281.34</b>
<b>Software, Hardware &amp; Services Total:</b>	<b>\$183,462.34</b>

### 3.3.5 Implementation Support and Training

Reference #	Requirement	Response (Y,Z,N,T)	Xrf
3.3.5.1	Toll Free Support Phone Number	Y	
3.3.5.2	24x7 Support	Y	
3.3.5.3	Software/Application Support	Y	
3.3.5.4	Remote diagnostic support software	Y	
3.3.5.5	Remote diagnostic support hardware	Y	
3.3.5.6	Documented escalation procedures	Y	
3.3.5.7	Dedicated Tier 2 (Mid-Level expertise) support staff	Y	
3.3.5.8	Dedicated Tier 3 (Senior-Level expertise) support staff	Z	
3.3.5.9	Portal to exchange information and support	Y	

- CompassCom will offer phone technical support for the system, Tier I and II support Monday-Friday. The hours of standard technical support will be discussed and agreed upon with the City of Rochester. CompassCom will work with to discuss an appropriate spare parts strategy of in-vehicle components for rapid replacement. CompassCom also will discuss an appropriate maintenance personnel strategy. If appropriate, CompassCom can also discuss GIS-related data issues and data integration with the City of Rochester personnel.
- CompassCom and Bergmann & Associates personnel will facilitate discussions with the City of Rochester's IT and GIS personnel to gain additional understanding of the AVL requirements. Upon completion of the discussion, CompassCom can prepare a Solution Design Document. This document will contain Functional and Technical requirements, Use Cases and Interfaces. This document will be presented to the City of Rochester for approval.
- Once installation of the modem hardware is complete, the vehicles need only to be added to the CompassLDE database by appropriate personnel and the system will instantly be expanded. No other user interaction is necessary for system growth.



### Technical Architecture

Server	Recommended
Server Role	CompassLDE, CompassReports or DB
Hard Drive Space & design	100 GB – RAID 5
RAM	8 GB
Processor Speed	2Ghz
Number of Processors	Dual Core
Other	N/A

### Prospects Standard

Standard	Complies Y/N
Runs under Windows 2003Server or 2008 Server	Y
Stores project data in Microsoft SQL 2005/2008 or Oracle database 10g/11g or port to SQL if necessary	Y
Runs under MS Hyper V R2	Y

### Recommended Third Party Software

Other Software	Product Information
Software Product	Recommend FireDaemon Pro
Version Number	3.5
Reason for Product	FireDaemon allows granular control of application services – costs about \$60

### **3.3.6 Internal Information Technology Personnel**

CompassCom Mobile Resource Management solution is normally maintained by the clients IT & GIS staff. The skill sets required are standard IT, database and GIS administration skills. If the client chooses to use their own communications department for the deployment of the wireless modems this is normally a standard in-vehicle modem install.

### **3.3.7 Written Documentation**

CompassCom has a complete set of Installation & Operations Guides and User Manuals available for our customers. These will be provided upon request or at the time of installation.

### **3.3.9 Project Management Methodology & Implementation Plan**

#### **Contract Mobility**

- Prior to contract signing, CompassCom will meet with the City of Rochester to discuss hardware, software, and system architecture requirements and options for the project. Upon issuance of a purchase order; contract documents are signed for all hardware and software necessary for the project.

#### **System Staging**

- Hardware is ordered for delivery to CompassCom, or a partner site. The hardware is programmed with the applicable GPS script for the network. In addition, the entire system will be staged for initial testing and certification.

#### **Delivery of Hardware to the customer**

- When staging, testing, and certification is complete, all hardware will be delivered to Cayman Island Government.

#### **Integration of AVL server**

- CompassCom will install hardware, software, and system components, including CompassTrac and the server software. This will correspond with the installation of in-vehicle units.

#### **In-vehicle equipment installation**

- CompassCom and its install partner (whether client or contractor) will work jointly to ensure a smooth & timely installation into all customer vehicles. CompassCom will test the entire system for operability.

#### **Training**

- A CompassCom certified trainer will perform server and client-side training for customer personnel for the purpose of system administration, software use and maintenance. CompassCom provides training online and in person. CompassCom will customize a training solution to meet the needs of your organization and stakeholders.

#### **System Acceptance**

- Once training is completed, pilot vehicle hardware packages have been installed, and the system is operational, the customer's project team will review the CompassLDE and CompassTrac Acceptance Test Procedure (ATP) documents and sign off when all functional criteria have been met. Once system acceptance has occurred, the customer can add additional vehicle hardware packages and copies of CompassTrac or CompassTrac Mobile at any time.

## Project Management


Project Managers at Bergmann Associates Geospatial follow PMI (Project Management Institute) project management frameworks. As PMP trained Project Managers, each successful GIS project is structured to ensure a reliable high-quality deliverable that meets budget and schedule. Deliverables are designed in collaboration with our customers to ensure buy-in and understanding of the final product. With many details to manage, we implement a Work Breakdown Structure to identify and track all deliverable components. This information is tracked using Microsoft Project software, allowing for visual review and reporting by our clients. The schedule identified milestones and activities, while also detailing critical path requirements. We schedule regular review meeting so that all stakeholders have visibility and input into each project task.

The process of system integration is as much about technology as it is people and business workflows. Getting databases 'to talk' is often the easy part. It is building consensus on what information should be shared between systems and the associated rules that can be more time consuming. Bergmann Project Managers are seasoned facilitators, working with our clients to build a consensus on practical solutions that address our client's business needs. Using visual tools such as application interface mock-ups, and workflow diagrams, we facilitate a design process that allows stakeholders to have input on the design and implementation of the solution.

We understand that a Project Manager's biggest job is communication. By facilitating a transparent and intuitive project methodology, we ensure our clients understand the why how and what of our work. We create stakeholder partnerships that lead to smooth and successful project implementations.

# Project Management Approach - Example

## Estimated Project Schedule

ID		Task Name	Duration	Start	Finish	Predecessors	Resource Names
1		Lake County AVL	77 days?	Tue 6/8/10	Wed 8/22/10		
2		Receive P.O.	2 days	Tue 6/8/10	Wed 6/9/10		
3		Contract Signing	8 days	Thu 6/10/10	Mon 6/21/10	2	
4		Kick off Meeting	1 day?	Thu 6/10/10	Thu 6/10/10	2	
5		Discuss Hardware	1 day?	Thu 6/10/10	Thu 6/10/10		
6		Discuss Cellular Carrier	1 day?	Thu 6/10/10	Thu 6/10/10		
7		Discuss IT Information	1 day?	Thu 6/10/10	Thu 6/10/10		
8		Order Hardware	10 days	Fri 6/11/10	Thu 6/24/10	4	
9		Configure Software	74 days?	Fri 6/11/10	Wed 8/22/10	4	
10		Set up Maps and GIS	6 days	Fri 6/11/10	Fri 6/18/10		
11		Set up User Passwords	1 day?	Fri 6/11/10	Fri 6/11/10		
12		Receive Hardware	10 days	Fri 6/25/10	Thu 7/8/10	8	
13		Activate Cellular Service	10 days	Fri 6/25/10	Thu 7/8/10		
14		Configure Hardware	8 days	Fri 6/25/10	Tue 7/6/10		
15		Ship Hardware	4 days	Wed 7/7/10	Mon 7/12/10	14	
16		Training	5 days	Tue 7/13/10	Mon 7/19/10	15	
17		Installation of Hardware	30 days	Tue 7/13/10	Mon 8/23/10	15	
18		Testing	15 days	Tue 8/24/10	Mon 9/13/10	17	
19		User Acceptance	7 days	Tue 9/14/10	Wed 9/22/10	18	

### 3.3.10 Technical Summary - System Capabilities

#### A. Software

##### Tracking features

1. CompassLDE (server software) and CompassTrac (client software) work in conjunction to display the GPS data accurately. CompassLDE monitors and records user activity.
2. CompassCom's solution allows the City of Rochester AVL administrator to assign any vehicle to any grouping for data tracking.
3. CompassLDE is capable of receiving information from all vehicles fitted with AVL, simultaneously and seamlessly into the SQL or Oracle database (whichever is preferred by the City of Rochester). These vehicles can have different GPS hardware model units; GPS information can be transmitted over different wireless formats, wi-fi or even 2-way radio such as Motorola ASTRO.
4. The GPS unit reports everything it collects: operational status, location, speed and all associated inputs related to the vehicle ID, including customized inputs such as plow up/plow down. Every transition collected from field GPS units has a vehicle identifier associated with the data. This identifier is always collected and stored on the server with the data from each GPS unit.
5. CompassTrac is able to view and print current and historical vehicle location information on a selected mapping background. A print button will print the display along with all of the user-defined layers.
6. CompassTrac includes a measuring tool to calculate each route segment and total distance of the desired route or distance between points. The measuring tool is able to follow a road or any path the user selects.
7. CompassCom is able to generate geofences (user-defined boundaries) at the vehicle and server levels. There is no limit to the number or shape of geofences; groups can be assigned to any number of separate geofenced areas as defined by the City of Rochester.

#### CompassReports™

CompassReports can filter various differentiators automatically. CompassReports gives the location and time the unit entered or left the geofenced area as well as the time in question. The "alerts" function sends a message to a pre-determined location when an exception to an operation filter takes place. The alert could be sent to multiple devices or multiple people.

CompassReports is a web-based product. It has the ability to provide a Dashboard report with maps filtered by fleet, group or individual asset. All collected field data is stored, and is available through CompassReports and the user-defined Dashboard.

## Standard Reports

Each of CompassCom's display clients includes a reporting module. Each user has the ability to run separate reports with filtering capability. Each user can filter by date/time, and by fleet, groups, or individual vehicles. Additional filters allow the user to set limits such as max speed, stop/idle time and/or input status (such as plow down).

- **Speed** – Displays the number of times each vehicle exceeded the speed designated by user/manager. Speed alerts are displayed as total per vehicle, per group and fleet-wide. Display each speeding incident just by clicking on the vehicle icon. The information consists of Unit ID, Date, Total Count, Requested speed limit, Min/Max and average speed, with start/stop times and location. This information can also be displayed in graphic format and the incident location can be shown by clicking on graph or map icon.  
(ROI value: speeding and aggressive driving increases fuel usage and maintenance requirements. Also, drivers with bad habits can be retrained for continuing improvement in efficiency and vehicle costs.)
- **Stop/idle times** – Display unit ID, date of occurrence, total count by vehicle, group, and fleet. Time stopped, started, and duration stopped over the time limit specified by the user/manager, as well as the location.  
(ROI: use for accountability, emissions compliance and fuel usage.)
- **Geofence** – Displays ID, number of times in geofenced area, duration of time in each geo-fence, starting time, ending time and location for each event.  
(ROI: prevents theft or removal from geofenced area for private use.)
- **Turn** – Displays group title, unit ID, date block, number of right turns and left turns.  
(ROI: allows for better route planning for fuel and mileage savings).
- **Mileage** – Displays group title, unit ID, date block, mileage, carbon count  
(ROI: better maintenance because based on actual mileage instead of estimations; helps assure accountability.)
- **Discrete inputs** – Displays group title, unit ID, date, mileage driven, discrete duration, start time, end time, location. Discrete information can be filtered from the report, providing every choice of input from one to dozens.  
(ROI: measurable, exact data allows for better management of every vehicle in the fleet, for cost reductions across the board.)
- **Activity** – Displays group title, unit ID, last date and time of activity, Input status, Speed, Heading, and Location.  
(ROI: accountability, including verifying - or effectively disputing – public complaints/issues about drivers.)
- **Snow** – Displays unit ID, date, mileage driven, operating hours, road temperature, air temperature, granular rate, granular total, liquid rate, liquid total. The information can be viewed by vehicle, group and fleet.  
(ROI: reduce usage of sand or other de-icing chemicals; improve efficiency and driver behavior to lower fuel costs.)
- **Data Export** – Allows the customer to download raw data from our data files to a predetermined data storage location inside their network. This allows the customer to have full access to the requested data for custom reports and/or archiving.

(ROI: less personnel time necessary to produce audit reports for compliance documents; minutes instead of hours or days.)

- **Alerts** – The event tab allows the administrator to set up a list of rules that will automatically notify the assigned personnel if a rule is triggered. These rules will be based on time/date, and/or, greater than/less than, input changes, geo-fence crossing (both in and out), excess speed, excess idle time, and mileage.

(ROI: knowledge in minutes rather than days, if something requires immediate attention, for instance a high-value asset removed from a geofenced area.)

Each report has the ability to display information in text form, and locations on a map.

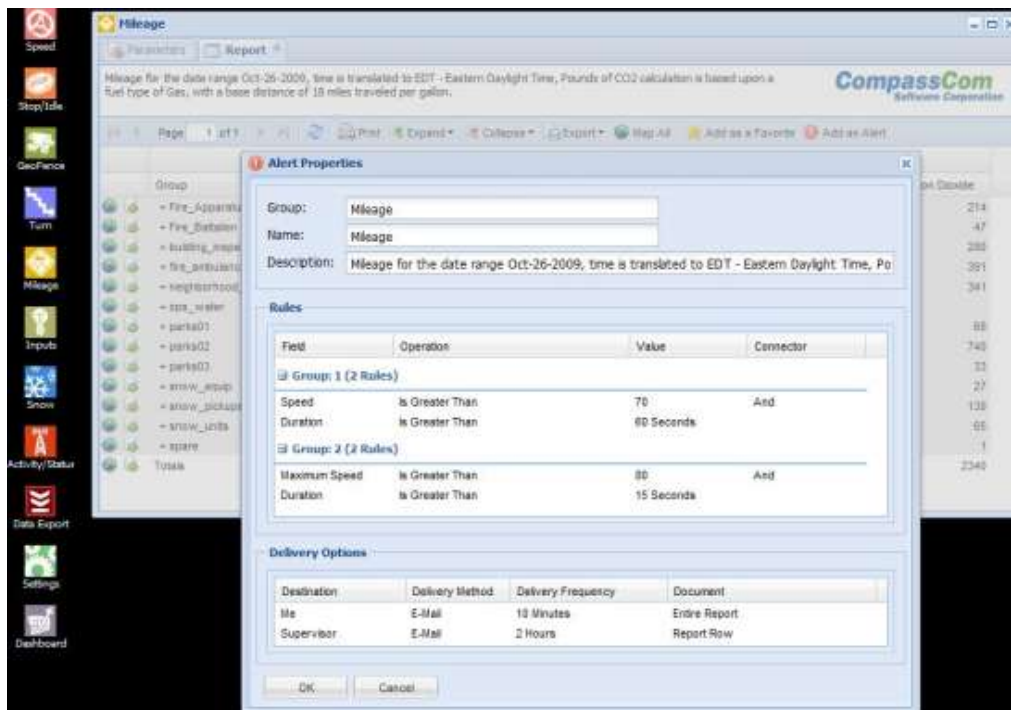
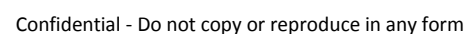


Figure 1: CompassReports™ screenshot showing map capabilities.





CompassCom offers the ability to customize the reports to suit the users' needs. Additional rule filters such as "if" "then" and "less than" or "greater than" to can be created for additional filtering of report data. CompassCom also offers clients the option of creating their own complete custom reports if required.



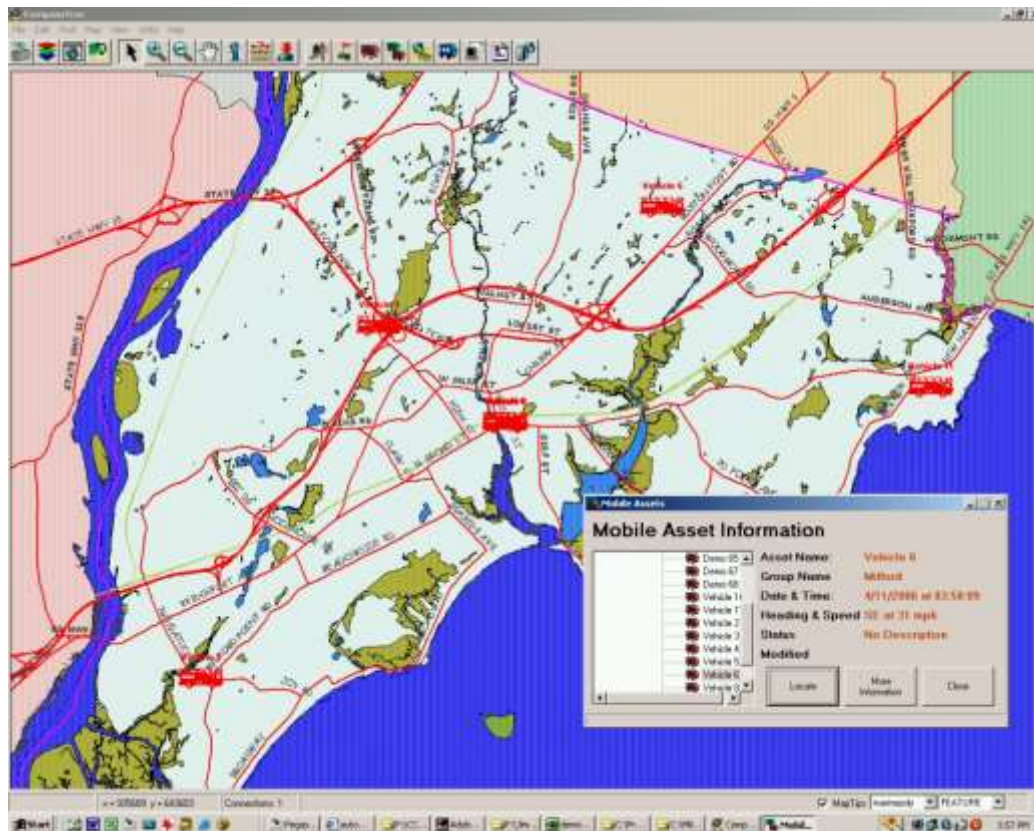
**Figure 3: CompassReports™ Screenshot of Stop/Idle parameters showing filtering capability.**

## Administrator rights/features

1. CompassCom's solution allows the City of Rochester AVL administrator to assign any vehicle to any grouping for data tracking. There is no limit to the number or shape of any Geofence, and each group can be assigned to any number of separate Geofenced areas of the city of Rochester choosing. These Geofences can overlap the same area if desired. These groupings can be modified by the County directly at your discretion.
2. All geo-fencing capabilities and permissions, whether temporary or permanent, can be controlled through the county's administrator directly.
3. CompassCom's solution has the ability to associate and disassociate defined geo-fences by fleet, group(s) and/or individual vehicles. The information from a geo-fenced area can be filtered by vehicle, group, or fleet wide. The information can be filtered from all the geo-fenced areas down to one area, or any combination thereof. All these choices are user defined.
4. The GPS unit reports everything it collects. This includes Vehicle ID, operational status, location, speed and all associated inputs, with every transition. CompassCom is able to generate geo-fences at the vehicle level and at the server level. If the Geofencing is monitored at the server level the unit will not be able to report in and out of a particular Geofenced area. If the geo-fenced area is monitored at the vehicle, the boundary penetration will be sent back by the on-board GPS unit.
5. CompassCom has systems in several large counties with very strict Security policies. In all cases, CompassCom has been able to accommodate their security concerns. CompassCom will be able to comply with security policies and standards.
6. CompassCom's reporting modules is capable of meeting and exceeding the requirements of the City of Rochester. CompassCom has listed a series of standard reports with a brief description of each.

## End user rights/features

CompassTrac® Mobile is the MRM viewing client that resides on the City of Rochester's laptops. The CompassTrac Mobile application supports many of the same functions as the workstation client display, but is optimized for in-vehicle use and supports full touch screen capabilities as well as in-vehicle routing and text messaging.



**Figure 3:** CompassTrac® Mobile Screenshot. CompassTrac Mobile is capable of showing the same screens as regular CompassTrac, for on and off-site management.

## System Security

CompassCom is able to offer our solution in both in-house licensed and ASP hosted. We are proposing a Rochester in-house solution within the City of Rochester network. The RFP requirements address both a dispatch system and Asset Management system that would require some engineering services from Bergmann & Associates.

### *Hosted Solution Benefits*

In the event that the City of Rochester is interested in a CompassCom Hosted solution here are a few benefits:

1. Data is hosted at a secured third-party site.
2. All data is backed up with automatic retrieval capabilities. The City of Rochester will be able to download data directly from the CompassCom network.
3. The CompassCom database contains GPS and sensor feed data and will be stored in CompassLDE standard format for easy access and interoperability.

4. CompassTrac client software gives the City of Rochester an Esri-based AVL mapping package that shows the real-time (and historical) position of all vehicles in a dispatch environment. However, security is also built in as through CompassTrac the user can see only the vehicles for which he/she is authorized. CompassTrac is a very powerful tool that gives the manager/dispatcher full management control. Each CompassTrac license also gives direct access to our full suite of reports offered by CompassReports.

## Interface capability

1. CompassTrac and CompassTrac Mobile (Display clients) are designed to utilize the City of Rochester's GIS data with the functionality offered through Esri's application format. CompassTrac can utilize any .shp file, allowing the customer to use their GIS data within the CompassTrac environment. CompassTrac allows the customer to utilize a master file for automatic updates. CompassCom is an Esri Business Partner and has been working with this mapping application since the 1990s.
2. The CompassLDE® software will allow the City of Rochester to share AVL data with any connected client terminal via the TCP/IP protocol. CompassLDE server software is able to interface with virtually any type of hardware in any combination using any type of wireless format. It is also able to share this information not just among our clients, but also many third party software systems, such as Computer Aided Dispatch, Work-Order Management system, other AVL systems, and even small scale or legacy software systems. CompassLDE is a message switch along with a data switch, allowing the dispatcher to communicate directly or through third party solutions. So, CompassLDE provides a full enterprise solution.
3. CompassTrac is able to display features such as names and boundaries. Since the City of Rochester can have as many layers as desired, all listed GIS functions are capable within our system.
4. CompassTrac has the capabilities to zoom in and out, and can store user-defined favorite scales so preferred views are easy to return to and even can be viewed simultaneously on a split screen (as many as six different screens at once). The map also allows the user to point, click on roadways, and give a common name identification or selected road.
5. CompassTrac is fully scalable, printable and allows as many layers as the user wants. The City of Rochester GIS administrator has full control of the legibility and format. The format can change as the user changes display scale (zooms in or out).

## GIS Mapping Support

- **Data Integration:** The CompassTrac display client is capable of supporting and integrating the City of Rochester's GIS data.
  - CompassTrac can accommodate integration of streets, highways, and related route and metadata such as names, speed load, and turn restrictions. Geo-coded address information is also usable.
  - The system will support administratively-defined layers for major geographical features, landmarks, jurisdictional boundaries, railroad tracks and more.
- **Data Display:** All display labeling and symbolization of point, line, and polygonal GIS features are configurable by the in-house administrator, and interface capability is available to the user.

- **Data Upgrade and Maintenance:** No proprietary data formats are used within our solution. CompassCom allows the end user to utilize the database of their choice in a non-proprietary format. CompassCom also allows the customer full administrative control over their database, allowing the customer to set best practice rules in maintenance, backup and recovery, purging, or archiving their data.
- **Data Export:** CompassCom supports several options in exporting data. Data can be exported in Report forms displayed in CompassReports™, or export just the report data to be utilized in another report format (such as CSV files). CompassReports also allows the user to export large blocks of data by date to a file of the users' choosing.

## B. Hardware: Wiring (In-Vehicle, Antenna, Sensors)

### In-Vehicle Unit

1. CompassCom is proposing the CalAmp LMU. This unit has the flexibility to adapt to many different applications and will operate across all vehicle types and perform as specified.
2. The LMU has the ability to transmit location information based on time, distance between updates and percent directional change, and any event occurrence. These options are user defined and can be combined to output on any and all occurrences or any combination of options. All transmissions include a time and location stamp, including the serial input.
3. All data is transmitted in real time to the LDE server and displayed in real time anywhere the unit is not in sleep mode. (Ignition sense wire does not see power).
4. The CalAmp LMU is accurate to 3 meters and is WAAS enabled.
5. Our hardware is tamper resistant. There are no adjustments needed on the units and it is sealed in a tamper resistant enclosure.
6. The LMU is designed to be permanently wired into the vehicle. The power connection has a locking tab that will ensure a secure connection, but allow the unit to be removed if desired.
7. The GPS unit attaches a time and location stamp with all transmissions, including serial information.
8. Any time the power is applied the unit resets. The units are easily moved from one vehicle to another. The City of Rochester assigned software administrator has the ability to reprogram the vehicle ID from the old vehicle to the newly assigned vehicle. All the connections are field removable for easy removal. This way the permanent wiring can be left in the old vehicle and the unit can be quickly connected to the new vehicle.
9. The unit is designed to operate between 9 and 30 Vdc. The unit can be moved from a 12-volt vehicle to a 28v vehicle without damage.
10. Our units are firmware and software based. The program is not volatile and data will not be lost due to loss of power. No preventative maintenance is required.
11. The GPS unit will come with documentation procedures for software and operating instructions. The programming menu is menu driven to minimize any errors.
12. No preventative maintenance is required.
13. The GPS unit is certified, and meets all federal and state regulations. See attached data sheet.
14. CompassCom's GPS unit is satellite based GPS and is WAAS enhance.
15. The GPS unit is capable of being programmed to client specifications. The programming is changeable by the client if desired in the future.
16. The unit is capable of using NMEA-0183 standard.



17. The CalAmp unit does have the ability to store and forward information in the case of lost communications. The unit can store 10,000 events, which is over 30 days.
18. The unit has an ignition sense wire that detects when the vehicle power is off. When the vehicle is off, the unit goes into sleep mode.
19. The units are modular in design. The unit is hardware expandable with plug in devices, and software upgradeable without having to touch each unit. Any software upgrades can be performed remotely. This ensures that the GPS unit will not be obsolete in the near future.

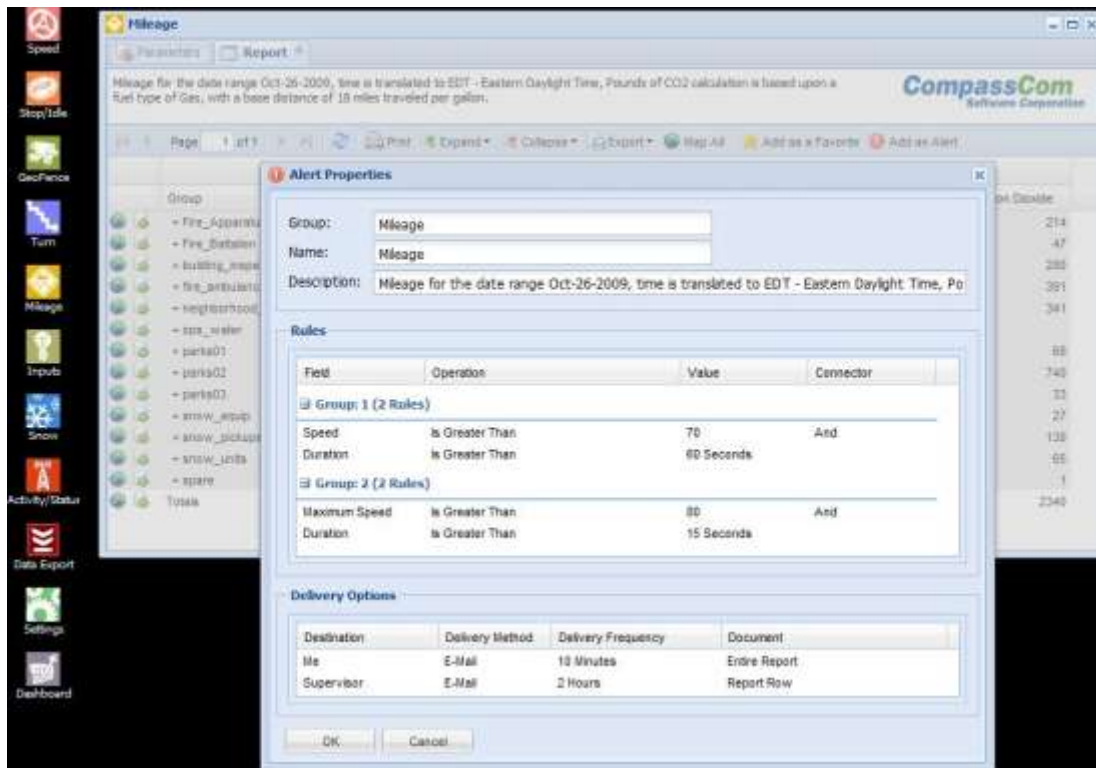
### **Antenna**

1. The antenna can be mounted firmly on the vehicle roof or similar parts.
2. The antenna in our proposal is ruggedized to withstand extreme temperatures, precipitation and high wind speed with no loss of function. This is the same antenna used on thousands of Public Works vehicles, including snowplows.
3. The antenna is designed to operate for a minimum of five years.

### **Sensors**

1. The GPS units quoted are capable of receiving inputs from all switches, of on/off design. The GPS unit labels are assigned by the client to indicate the desired response. (i.e. on/off, open/closed, up/down, etc.).
2. The sensor can be remotely mounted and hardwired at any location of the clients choosing.

CompassCom will comply with Client Confidentiality provisions established with mutual non-disclosure and the mutually agreed upon Statement of Work after the contract is awarded.



*Mileage report*

## 6.1 OBJECT - Vehicles

A vehicle is any equipment that is used to perform a city service/activity. We have a myriad of vehicles starting from HHR's to Side load packers and similar heavy duty trucks.

### 6.1.1 PROCEDURE - Assign the vehicle to a route

Dispatch will assign a specific type of vehicle to the route depending on the type of activity to be performed.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.1.1.1	Add a vehicle to a pre-determined group.	User Interface	Y	
6.1.1.2	Change the vehicle from one group to another.	User Interface	Y	
6.1.1.3	Change display icons for vehicles of the same group.	User Interface	Y	



### 6.1.2 PROCEDURE – Retrieve the vehicle from Lot

After dispatch makes vehicle assignments, the driver walks into the lot to locate and drive the vehicle assigned to his route.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.1.2.1	Identify the location of vehicles Within the parking area (e.g. CVMF parking lot).	User Interface	Y	
6.1.2.2	Transmit a specific signal from the vehicle indicating that the vehicle is parked for service.	User Interface	Y	

### 6.1.3 PROCEDURE - Drive the vehicle

The location of a particular job can be pre-determined if it is part of a regular route, or can be inferred from a work order / work request, and then the vehicle(s) involved in performing the same will drive to this address/location.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.1.3.1	Perform engine kill after deeming it is safe to do so in lost or stolen equipment.	User Interface	Y	
6.1.3.2	Perform route playback.	User Interface	Y	
6.1.3.3	Provide a bread crumb trail for a specified time frame with no limitations on the different factors.	User Interface	Y	
6.1.3.4	Capture geo-fence based events.	User Interface	Y	
6.1.3.5	Auto email resources when a geofence event triggers. The City uses MS Exchange Server / Outlook for email applications and the vendor should be able to provide this service in the specified software environment.	Report	Y	
6.1.3.6	Have unlimited geo-fences on a map.	User Interface	Y	
6.1.3.7	Have overlapping geo-fences.	User Interface	Y	
6.1.3.8	Activate or deactivate geo-fences based on the activity that we monitor.	User Interface	Y	
6.1.3.9	Locate vehicle or vehicle groups at any given time.	Report	Y	
6.1.3.10	Optimize the different routes to reduce vehicle miles travelled. The City uses RouteSmart technologies' RouteSmart® for route optimization and the vendor must either integrate with RouteSmart® or provide an ancillary add-on to the AVL solution	User Interface	Y	

	for route optimization.			
6.1.3.11	Set the ping rate based on vehicle type and / or use.	User Interface	Y	
6.1.3.12	Store data on the device and forward (session persistence) when it can communicate back to the base.	Other	Y	
6.1.3.13	Set what types of data are transmitted in real-time or near real-time (e.g. Location, Engine Trouble) and what types are stored for download (passive) at the end of the day (e.g. Time Between Service Stops) determined on a per vehicle basis	User Interface	Y	
6.1.3.14	Notify 911 or trigger emergency alarms from the device for certain vehicle (e.g. Panic button).	System Interface	Y	
6.1.3.15	Capture vehicle maintenance and emergency repair issues (e.g. Engine light). The City uses CCG Systems' FASTER Fleet Management for management of its fleet of vehicles and equipment. The vendor must be able to provide integration with FASTER.	Report	Y/T	CompassCom can provide interface to Faster for mileage, fuel use, etc.  Prova Systems is for OBD plug-in
6.1.3.16	Recognize and flag dangerous maneuvers (e.g. U-turns).	Report	Y	
6.1.3.17	Notify (email, SMS) system administrator on alerts, alarms or flagged data. The City uses MS Exchange Server / Outlook for email applications and the vendor should be able to provide this service in the specified software environment.	Report	Y	
6.1.3.18	Configure the unit to provide turn by turn directions.	User Interface	T	Garmin, other
6.1.3.19	Install modular AVL hardware to permit tracking a specific subset of vehicles through component removal and re-installation.	Other	Y	
6.1.3.20	Vehicle operators can “flag” specific locations, and annotate conditions for immediate alert and follow-up, specifically upon encountering a potentially hazardous condition.	Business Form	Y	
6.1.3.21	Track vehicle speed.	User Interface	Y	
6.1.3.22	Track and report on vehicle miles travelled. The City uses CCG Systems' FASTER Fleet Management for management of its fleet of vehicles and equipment. The	Report	Y	

	vendor must be able to provide integration with FASTER.			
6.1.3.23	Initiate an alert if a vehicle becomes stationary for more than the designated period of time while the engine is running (i.e. Idle time).	Report	Y	
6.1.3.24	Set minimum speed levels for reports based on activity.	Report	Y	
6.1.3.25	Utilize “geo-fences” to deter travel beyond approved geographic limits and identify potential abuses.	User Interface	Y	
6.1.3.26	Transmit alerts using data from the obd2 (on board diagnostic software) would be sent out over a communication network indicating when preventative maintenance is required. The City uses CCG Systems' FASTER Fleet Management for management of its fleet of vehicles and equipment. The vendor must be able to provide integration with FASTER.	System Interface	T	Prova Systems
6.1.3.27	“Encrypt” wireless data streams.	Other	Y	
6.1.3.28	Notify the vehicle driver approaching hazardous/ road conditions (e.g. Speed bumps) with periodic refresh from a leading provider of maps, traffic and location data.	System Interface	T	Garmin, other
6.1.3.29	Utilize AVL data as a remote/virtual inspection force.	Other	Y	
6.1.3.30	Notify system administrator that a vehicle needs regeneration.	Report	Y	
6.1.3.31	Vehicle operators can inform dispatch when the vehicle is idling for regeneration.	Decision Criteria	Y	
6.1.3.32	Run reports to validate vehicle regeneration calls.	Report	Y	
6.1.3.33	Differentiate (color code) vehicles that are regenerating.	User Interface	Y	
6.1.3.34	Track the status of a boom on boom trucks (e.g. Boom - up or Boom - down).	System Interface	Y	

## 6.1.4 PROCEDURE - Dump the vehicle

The vehicle is driven to pre-determined dump locations to off-load the carrying weight.

Reference	Requirement	Requirement	Response	Xrf
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#		Type	(Y,Z,T,N)	
6.1.4.1	Notify when the load limits have been exceeded on dump trucks.	System Interface	Y	

### 6.1.5 PROCEDURE - Fuel the vehicle

The vehicle is driven to the pre-determined city fueling facilities (unless there is an emergency or special memo in vogue) if this is part of a process mandate (i.e. must fuel at the close of shift) or on an as needed basis.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.1.5.1	Integrate with a fuel system. The City uses OPW Petro Vend's K800™ Fuel Control System for centralized control of our fueling operations. We use OPW's Phoenix™ software to import and update fuel data from Petro Vend.	System Interface	Z	
6.1.5.2	Validate that the vehicle is authorized to fuel at a specific facility. The City uses OPW Petro Vend's K800™ Fuel Control System for centralized control of our fueling operations. We use OPW's Phoenix™ software to import and update fuel data from Petro Vend	User Interface	Z	

### 6.1.6 PROCEDURE - Set salt application rate on the vehicle

We use FORCE® America equipment on our salting vehicles. The driver sets the pre-approved salt application rate. The management staff makes this call with the knowledge of the road surface temperatures that they can get from the sensors on the vehicles.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.1.6.1	Monitor salting rate and determine amount left. The City uses FORCE® America's SSC5100 salt spreader controls to manage the distribution and application of anti-icing materials during winter operations. The Vendor must integrate their solution with FORCE® America.	System Interface	Y	
6.1.6.2	Monitor salt spreader gate status (open/closed). The City uses FORCE® America's SSC5100 salt	System Interface		

	spreader controls to manage the distribution and application of antiicing materials during winter operations. The Vendor must integrate their solution with FORCE® America.		Y	
6.1.6.3	Flag the system with an empty salt truck. The City uses FORCE® America's SSC5100 salt spreader controls to manage the distribution and application of anti-icing materials during winter operations. The Vendor must integrate their solution with FORCE® America.	User Interface	Y	

### 6.1.7 PROCEDURE - Plow and/or salt streets with the vehicle

During the winter months, equipment operators drive thru the city streets performing plowing and salting operations. Any truck with a plow, or vehicles with salt bodies, can be used for this purpose.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.1.7.1	Capture the percentage of a given route completed.	System Interface	Y	
6.1.7.2	Track the status of a plow (e.g. Plow - up or plow - down). The City uses FORCE® America's vehicle equipment to control and manage roadway plowing during winter operations. The Vendor must be able to integrate their solution with FORCE® America.	System Interface	Y	

### 6.1.8 PROCEDURE - Sweep streets with the vehicle

From May through October, equipment operators drive thru the city streets performing sweeping and flushing operations.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.1.8.1	Track and report the level of water in the water tank of sweepers. The City uses Elgin Pelican® Three-WheelBroom Sweepers (mix of mechanical and hydraulic) and Elgin Crosswind® 4 Wheel Regenerative Air Sweepers.	System Interface	Z	

	The vendor must be able to integrate their solution with Elgin vehicle equipment.			
6.1.8.2	Track the status of the water flow on sweepers (e.g. water flow on or water flow off). The City uses Elgin Pelican® Three-Wheel Broom Sweepers (mix of mechanical and hydraulic) and Elgin Crosswind® 4 Wheel Regenerative Air Sweepers. The vendor must be able to integrate their solution with Elgin vehicle equipment.	System Interface	Z	
6.1.8.3	Track the filter status on sweepers (check if filter is clogged or needs replacement). The City uses Elgin Pelican® Three-Wheel Broom Sweepers (mix of mechanical and hydraulic) and Elgin Crosswind® 4 Wheel Regenerative Air Sweepers. The vendor must be able to integrate their solution with Elgin vehicle equipment.	System Interface	Z	
6.1.8.4	Track the status of the debris hopper on sweepers (check if hopper is full). The City uses Elgin Pelican® Three-Wheel Broom Sweepers (mix of mechanical and hydraulic) and Elgin Crosswind®4 Wheel Regenerative Air Sweepers. The vendor must be able to integrate their solution with Elgin vehicle equipment.	System Interface	Z	
6.1.8.5	Track the status of a broom on sweepers (e.g. Broom - up or Broom - down) independently for curb-side and street-side brooms. The City uses Elgin Pelican® Three-Wheel Broom Sweepers (mix of mechanical and hydraulic) and Elgin Crosswind®4 Wheel Regenerative Air Sweepers. The vendor must be able to integrate their solution with Elgin vehicle equipment.	System Interface	Y	

## 6.1.9 PROCEDURE - Park the vehicle

The vehicle will be returned to its starting point by default to park vehicle. If the driver identifies or suspects a mechanical issue with the vehicle, he drives to the Central Vehicle Maintenance Facility (CVMF) and parks it for service in the lot.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.1.9.1	Transmit a specific signal from the vehicle indicating that the vehicle is parked for service.	User Interface	Y	

### 6.1.10 PROCEDURE - Dispatch City vehicles for contractor routes with breakdowns

When a contractor calls in a breakdown, these routes will be covered with a vehicle from the City fleet.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.1.10.1	Add a vehicle to a different group (e.g. add an arterial vehicle under contracted snow plowing).	User Interface	Y	
6.1.10.2	Differentiate this route from all other normal routes under this group /	User Interface	Y	
6.1.10.3	Track the status of a plow (e.g. Plow - up or plow - down). The City uses FORCE® America's vehicle equipment to control and manage roadway plowing during winter operations. The Vendor must be able to integrate their solution with FORCE® America.	System Interface	Y	

## 6.2 OBJECT - Maps

The map object can be any physical or electronic maps used by equipment operators to reference their route, route sequence or a single location.

### 6.2.1 PROCEDURE - Review the map to determine route sequence

The equipment operator refers to map data to determine best route, next address in sequence etc.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.2.1.1	Display a map interface on the	User Interface		



	onboard dashboard. We require ArcGIS 10 or a comparable map interface using the City's existing map layers and or routes for the different services/operations so we can track operations in a route centric or service centric format.		Y	
6.2.1.2	Resolve address on work request and plot on map. The address could come from our work order system, so we require that the AVL solution be able to resolve address information and geo reference the address provided by the work order system, in various possible address formats.	Other	Y	
6.2.1.3	Display route to work location. Possible use of turn by turn navigation with spoken and visual instructions.	System Interface	Y	
6.2.1.4	Update route to accommodate dynamic work request changes. Routesmart® or use of the in-built routing software.	System Interface	Z	
6.2.1.5	Plot work locations on the map when on route. If the driver observes a situation needing attention, they can mark the location of work on a map available on the on-board display which then gets delivered to dispatch at regular intervals for further research and assignment.	User Interface	T	Garmin, Magellan, other
6.2.1.6	Switch between weather maps and geo-fences to help make decisions.	User Interface	Y	
6.2.1.7	Configure the unit to provide turn by turn directions with a map display.	User Interface	T	Garmin, Magellan, other

## 6.2.2 PROCEDURE - Monitor the contractor vehicle location for compliance

The contractors are assigned specific routes and are monitored for route compliance (e.g. they cannot deter from the route boundaries when a route is in progress).

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.2.2.1	Determine all vehicles are at their respective start points.	Report	Y	
6.2.2.2	Verify that a contract vehicle is within the geo-fenced area when the	User Interface	Y	

	activity is in progress.			
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## 6.3 OBJECT - Work Requests

A work request is a record / form / document describing the work to be done and furnishes information about the work location, route etc. as well. This can be generated from several different systems in the city including LAGAN, Maintain-IT, Mainframe etc.

### 6.3.1 PROCEDURE - Review the work request to determine work to be completed

The equipment operator reads through a work request to determine the location where work needs to be performed.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.3.1.1	Access work request from an onboard display.	User Interface	T	Bergmann
6.3.1.2	Make modifications to work request and track changes.	User Interface	T	Bergmann
6.3.1.3	Dynamically add work request to existing work queues.	User Interface	T	Bergmann
6.3.1.4	Integrate a work order/complaint management system within, or as a complement to, an AVL solution.	System Interface	Y	

### 6.3.2 PROCEDURE - Create the work request

Depending on the source of the work request, different personnel can create work requests in the system if they are assigned permissions to do so.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.3.2.1	Set up an activity in the AVL system to reflect the crew performing work requests for the day.	Other	T	Bergmann

### 6.3.3 PROCEDURE - Notify on the work request status

Inform dispatch about the status of a work request and/or provide updates.

Reference	Requirement	Requirement	Response	Xrf
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#		Type	(Y,Z,T,N)	
6.3.3.1	Readily integrate spatial and, where applicable, vehicle status data gathered through the AVL system into LAGAN, the customer relationship management software utilized by 311.	System Interface	T	Bergmann

### 6.3.4 PROCEDURE - Update the work request

Update the work request with notes and status updates provided by field personnel.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.3.4.1	Readily integrate spatial and, where applicable, vehicle status data gathered through the AVL system into LAGAN, the customer relationship management software utilized by 311.	System Interface	T	Bergmann
6.3.4.2	Capture the percentage of a given route completed.	Decision Criteria	T	Bergmann

## 6.4 OBJECT - Dispatch Records

A dispatch record is an entry in the Dispatch System which is an MS Access based system. This system has the ability to track the progress in snow and ice related activities like plowing, salting, towing and more.

### 6.4.1 PROCEDURE - Dispatch the vehicle

The dispatcher in every area will assign a specific vehicle to a route depending on the activity to be performed.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.4.1.1	Interface with the data in the dispatch system.	System Interface	T	Bergmann
6.4.1.2	Track all the information currently stored in the dispatch system.	Other	T	Bergmann
6.4.1.3	Differentiate a dispatched vehicle from a vehicle in the lot	User Interface	T	Bergmann

### 6.4.2 PROCEDURE - Update the dispatch information

Make notes and change the status of an on-going activity in the dispatch system.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.4.2.1	Equipment operator can update the dispatch system.	Business Form	T	Bergmann

### 6.4.3 PROCEDURE - Notify on the route status

Inform dispatch about the status of an activity or provide updates.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.4.3.1	Have two way communications between the vehicles and dispatch (e.g. messaging, radio).	Other	Y	

### 6.4.4 PROCEDURE - Create the dispatch information

Create a record in the dispatch system capturing the details of an activity and recording its start.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.4.4.1	Set up an activity in the AVL system to reflect the dispatch information.	Other	Y	

## 6.5 OBJECT - Geodatabases

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A geodatabase is a data repository for spatial data storage and management.

### 6.5.1 PROCEDURE - Update the geodatabase with run information

Export route data from a web-based system and import it into a geodatabase for persistent storage.

Reference #	Requirement	Requirement Type	Response (Y,Z,T,N)	Xrf
6.5.1.1	Export historic AVL data into a commercial GIS environment for subsequent analysis. The City of Rochester has a centralized GIS using software products from Environmental Systems Research Institute (ESRI). Currently, ESRI®	System Interface	Y	

	ArcView9.x client software is installed on desktop workstations throughout the City of Rochester. Central data storage of geographic data files is housed using ArcSDE and ArcIMS v4.0.			
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## SECTION 7 – Technical Requirements

This section of the document defines the technical requirements for the proposed system which address architecture, data, security, and system interfaces.

### 7.1 Architecture

The purpose for the Architecture is to depict the technical elements that come into play within an informational system, in order to permit the applications to function smoothly with little or no downtime. It also functions as the baseline or foundation for which the applications reside and depend upon.

Reference #	Requirement	Response (Y,Z,T,N)	Xrf
7.1.1	Provide architecture that is modular, scalable, and extensible.	Y	
7.1.2	Reside on any standard hardware platform and operating system (not proprietary).	Y	
7.1.3	Host the solution for the City of Rochester.	Y	
7.1.4	Provide a detailed plan with costing and assist in implementing the same if the City of Rochester decides to host the solution.	Y	
7.1.5	Provide an always connected wireless data network	T	Cellular provider
7.1.6	Provide a satellite communication network for areas where ground-based wireless communications is weak.	Y	
7.1.6	Provide a satellite communication network for areas where ground-based wireless communications is weak.	Y	
7.1.7	Receive and forward position information from the vehicle's satellite transmitter.	Y	
7.1.8	Ability for two-way mobile messaging to allow email messaging to and from the driver over the Internet wireless communications link.	T	Cellular provider
7.1.9	Send information via satellite, nationwide cellular network or radio frequency — or a combination thereof.	Y	
7.1.10	Provide data transmission without recurring or monthly costs.	Y	

7.1.11	Demonstrate experience with integrated AVL/GPS systems.	Y	
7.1.12	Evolve with new technologies to meet future needs as they arise.	Y	
7.1.13	Perform a complete historic data recovery and reporting during an event of hardware failure or network failure emergencies.	Y	
7.1.14	Provide an open API to make integration processes.	Y	
7.1.15	Provide seamless integration to PC based MS® Office products.	Y	
7.1.16	Operate on most current version of Internet Explorer.	Y	
7.1.17	Use HTTPS and other secure means of data transmission including data encryption.	Y	
7.1.18	Interface with standard languages and protocols (not proprietary).	Y	
7.1.19	Configure software from an administrator point of view, with full audit of any configuration change captured.	Y	
7.1.20	Support full software change control process with check-in and check-outs.	Y	
7.1.21	Interface with Microsoft® SQL Server 2005 or higher	Y	
7.1.22	Provide complete on line documentation including: Installation/Set-up & Configuration, Training/Tutorial, Application, Process Flow and Reference.	Y	
7.1.23	Define alerts at the user level to notify specified individuals or groups when triggered by an event.	Y	
7.1.24	Set-up alerts across all modules.	Y	
7.1.25	Set-up and receive administrative notification of specific activities that may not require user intervention (System Alerts).	Y	
7.1.26	Interface with the following to provide notifications: MS® Outlook Exchange email and PDAs.	Z	
7.1.27	Remotely manage the environment from a Vendor or City IT perspective using a web interface.	Y	

## 7.2 Data Requirements

Reference #	Requirement	Response (Y,Z,T,N)	Xrf
7.2.1	Display dates in the USA format.	Y	
7.2.2	Support the translation of views and instructions into multiple languages (e.g. English, Spanish).	Z	

7.2.3	Provide Entity Relationship Diagrams (ERD) showing layout of tables, fields and data entity relationships.	Y	
7.2.4	Provide data dictionary with ability to interface electronically to industry standard reporting environments (i.e. Microsoft® business intelligence).	Z	
7.2.5	Provide numerous user definable fields in every table that will be used by the application.	Y	
7.2.6	Automatically archive and purge data per retention period.	Y	

## 7.3 System Administration, Security and Audits

Reference #	Requirement	Response (Y,Z,T,N)	Xrf
7.3.1	Authenticate a person's credentials through Windows Active Directory®.	T	Bergmann
7.3.2	Easily set-up and maintain users within functional groups that can be nested, taking on the parents rights and restricting that further.	T	Bergmann
7.3.3	Effect Site/Group-level security (user can view site specific data or multi-site data based on security preferences assigned).	Y	
7.3.4	Effect Site/Group-Specific security configuration per user (user security access may differ from site to site).	Y	
7.3.5	Define read/select, insert, update, and delete in any combination or set for Module/Function/Field for any Group or Individual in an easy to maintain way.	Y	
7.3.6	Produce reports which identify who has access to run reports, audit trail log depicting report additions, deletions or changes noting the user who made, time and date stamp.	Y	
7.3.7	Capture a before and after snapshot of data (audit trails) that changes within a system in a text based, non-system specific, human readable format. This should not hinder system performance, and be configurable and user friendly.	T	Bergmann
7.3.8	Capture when reports are printed and noting the user, time and date stamp.	Y	
7.3.9	Capture when reports are viewed and noting the user, time and date stamp.	Y	
7.3.10	Limit access to information based on security level.	Y	
7.3.11	Display fields based on security level.	Y	
7.3.12	Limit editing capability to the record creator & security level.	Y	



7.3.13	Customize the software based on the end-user's role in the system.	Y	
7.3.14	Restrict the vehicle groups that a specific end user can see.	Y	
7.3.15	Restrict vehicle routes that a specific end user can see.	Y	

## 7.4 System Interfaces

The purpose of this section of the document is to provide easy access between independent and disparate systems and assure accuracy in the transfer of data between them. Describe in the response how interfaces will be addressed in the recommended solution. For example, are Application Program Interfaces (API's) used or will interfaces be developed on a case-by-case basis. In addition, identify if interfaces have been implemented with existing customers and what type of applications have been interfaced.

The vendor should provide a diagram that visually shows all integration points in their proposed solution, as well as any other vendors' product recommended to meet the requirements of this RFP. In addition, the vendor should describe its technical strategy to actively integrate to other vendors' Page 42 of 62 products or existing City in-house systems described in Section 5 – *Legacy Systems Environment* that fulfill the City of Rochester's functional needs outside the scope of this RFP.

Reference #	Requirement	Response (Y,Z,T,N)	Xrf
7.4.1	Interface with other software products owned by the vendor but which are in another family to meet a need that does not exist in the standard product, regardless of what platform that product may reside on.	Y	
7.4.2	Provide plug-in designs that do not require special coding.	Y	
7.4.3	Interface with third party sources of information via a Web Service call.	Y	
7.4.4	Perform data imports and exports from and to both desktop and applications running on other processors.	Y	
7.4.5	Interface seamlessly with barcode and other data collection devices.	Y	
7.4.6	Interface with HID smart cards attached to user profiles.	Y	Accessories needed
7.4.7	Provide remote help desk support via telephone and live on-screen control.	Y	

## Application Integration with the CompassLDE

The CompassLDE provides a method for creating an integrated mobile resource management system, which includes Automatic Vehicle Location (AVL) with monitoring and control, Machine-machine (M2M), Computer-Aided Dispatch (CAD), and text messaging to mobile, desktop, and server systems. In the case of a CAD system, AVL can be built-in, statuses and incidents can be broadcast to mobile and desktop systems, statuses can be received from mobile units, text messages can be sent to and from both CAD and mobile systems, and all messages can be stored for legal, planning and analysis purposes. Messages can be broadcast by an application and can be sent to the application from mobile or desktop clients. Overall, this is the nuts and bolts of messaging via the LDE API. CompassCom provides a detailed document that describes the many different messages that can be communicated. It is called:

### Messaging API for LDE.

#### Overview

The LDE utilizes TCP/IP and direct socket level communications to pass information to clients and it's own internal components. The messages passed between applications are formatted using XML, a text-based, human-readable messaging standard. Selection of XML means that integrating into a system is easy for programmers to understand, design, debug, and support. Even nonprogrammers can view XML messages and understand what data is being passed. Also, XML parsers are available for programmers, which allows for very easy extraction of data from the messages.

The hub of the LDE system is a message server embedded within LDE that is responsible for receiving and sending messages and storing those messages in a database for historical purposes. All applications that wish to participate in the integrated system must register with LDE. Depending on the application's purpose in the system, the registration process may be slightly different. For example, the types of messages that would be of interest to a CAD are Vehicle Positions, Statuses, Incidents, Text, and System. Other systems may only be interested in the real time position messages. Information about messages: LDE TCP Socket Ports In order to keep a burst of messaging from flooding a particular TCP/IP port, LDE uses four ports to spread out the messaging load. This means many messages are handled evenly and easily. These four ports are called **Realtime**, **Config**, **History**, and **Message**.

The **Realtime** port is the port over which realtime vehicle positions are passed. The **Config** port is where configuration information is passed to clients logged on to LDE, and the **Message** port is the port where all of the other messages are passed, including Status, Incident, System, Text and MessageState. The **History** port is where historical data is requested by and passed-back to clients. Registration messages are handled on the port of interest, meaning that to connect to the **Config** port, the registration messages go over the **Config** port. These four ports are always contiguous and in a specific order. In the LDE config file, an entry for the **Realtime** port needs to be selected. If port 1260 is selected, then the **Config** port will automatically be 1261, the **History** port 1262, and the **Message** port 1263. Due to large messages sent via low-bandwidth wireless technologies, the messages on the **Config** port **MAY BE** compressed with the **ZLib** compression library (<http://www.gzip.org/zlib/>). This is a royalty-free, patent-free, license-friendly (it is almost public domain, perhaps closer to a BSD license), portable, and stable compression library. Only two calls are used, "compress" and "uncompress". We prepend each compressed message with an 8 byte, ASCII representation of the compressed message length, and an 8 byte ASCII representation of the uncompressed message length.

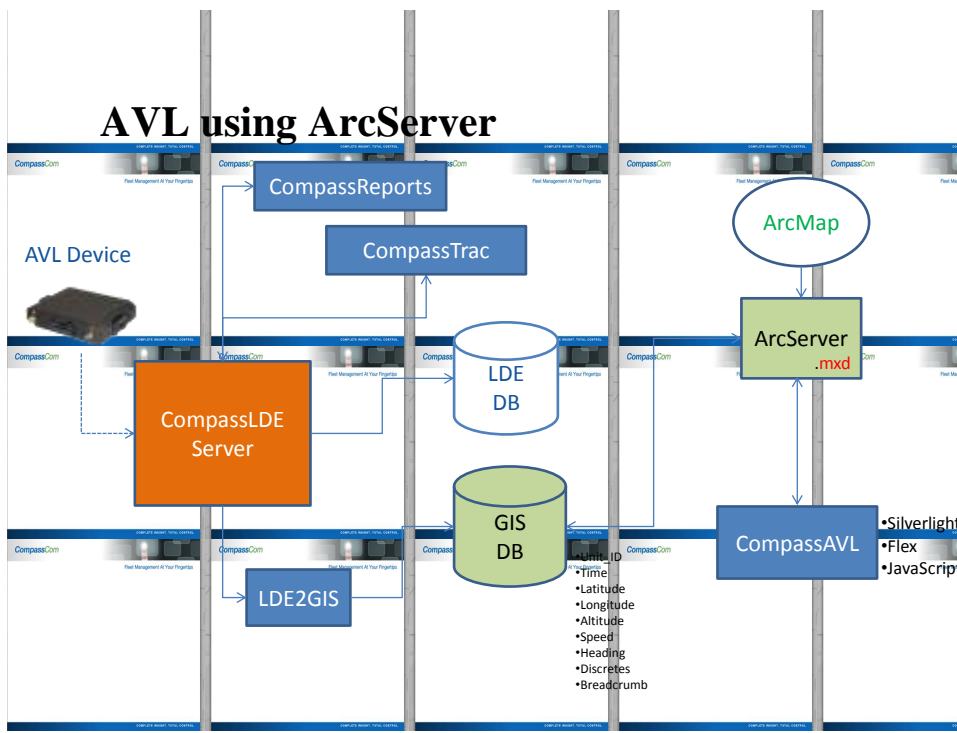
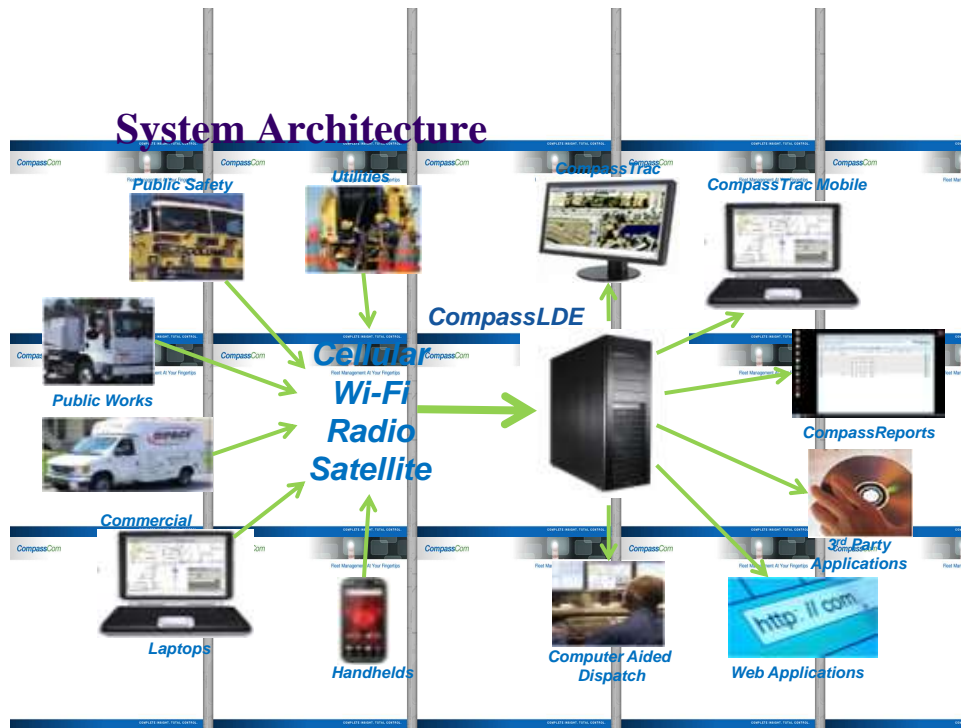
### **Third Party Applications for CompassLDE**

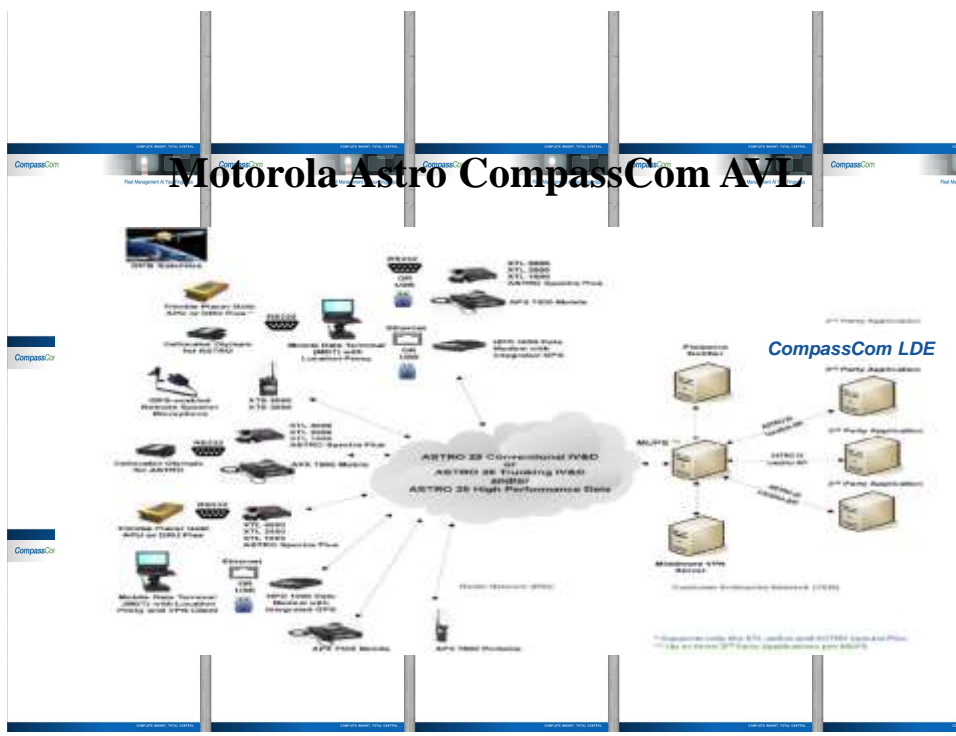
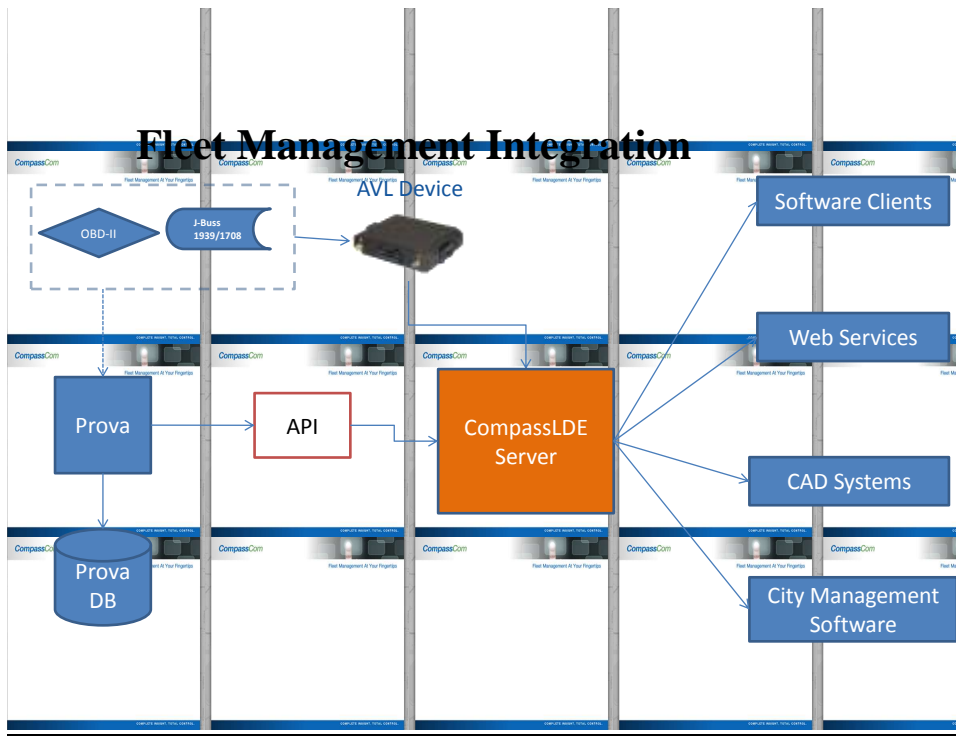
CompassCom's AVL solution provides easy third party interface to snow plow spreader controllers. CompassCom has created software interfaces with four major companies in the snow plow spreader controller market: Force America, Dickey-John, Certified Power, and E-poke. This complements CompassCom's ability to capture discrete I/O functions of plow up/down, broom up/down, lift boom up/down. We are confident that if we need to interface to another spreader controller system we would be successful, based on our track record and longevity in the industry. The snow report in Compass Reports captures the Material Management of each spreader controller on a daily, weekly, monthly and yearly basis. The geo-business intelligence gathered allows public works directors to manage the snow fighting supplies (sand, cinders, salt, liquid) needed for the following years' snow operations, improving ROI year after year.

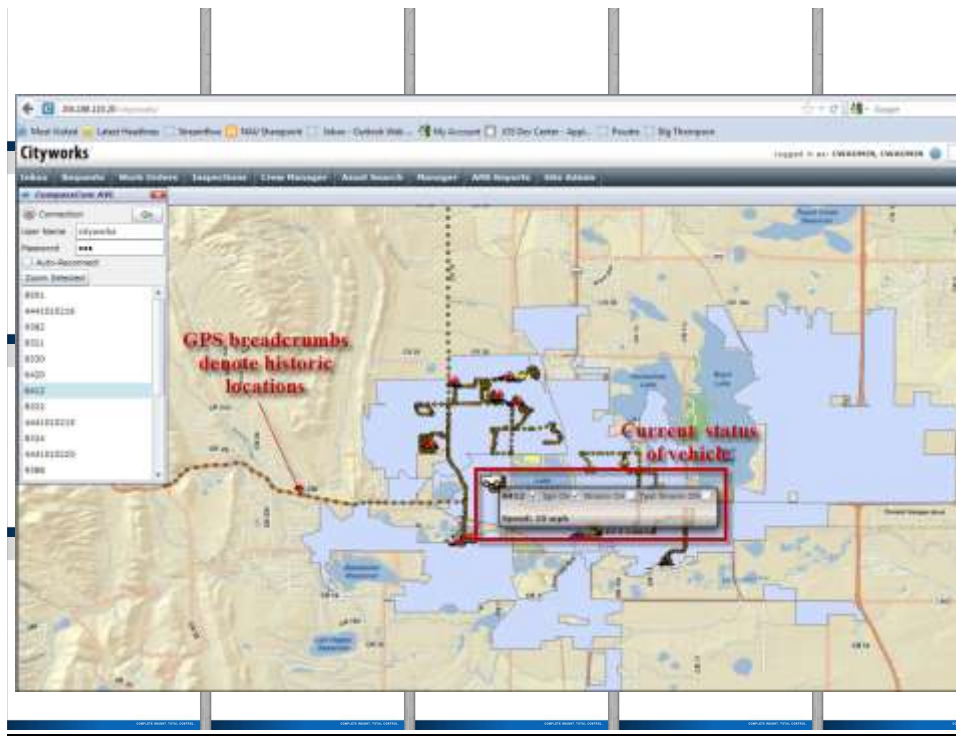
Work Order Management is a Service Request automation software used in government and commercial organizations. CompassCom is the only approved partner with Azteca to interface with their Cityworks Work Order Management solution used by many state and local government agencies. CompassCom also has interfaces with Work Order Management solutions provided by Maximo, Cartegraph, Oracle and Idea Integration. Seattle Public Utilities is using Maximo as their work-order management software and developed the interface in-house using our open API.

Computer Aided Dispatch (C.A.D.) interfaces to CompassLDE are critical to our Public Safety customers. This C.A.D. interface with real-time AVL allows 911 dispatchers precise vehicle locations for purposes of situation awareness. This C.A.D. software interface allows Interoperability between multiple agencies in police, fire and emergency services. Today CompassCom interfaces to C.A.D. systems from HTE SunGard, Tiburon, Tri-Tech, Cross Current, Enroute 911 and Sleuth Software.



The CompassCom solution is a proven, scalable and secure architecture that has been deployed for thousands of vehicles in Federal-State & Local markets. CompassCom is confident that the service and support provided to the City of Rochester both during implementation and after system sign-off will surpass your expectations.





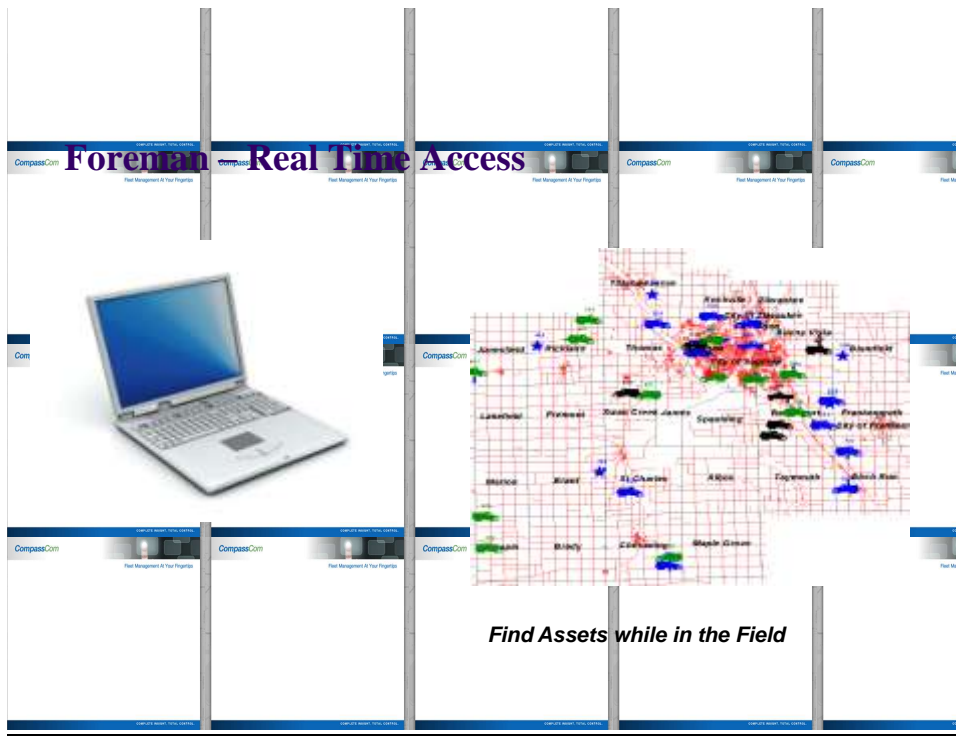


### Lone Worker Duress

- Safety alerts are sent as a priority message to the CompassLDE
- Man Down 900mhz pendant with range of up to 2500ft
- Pendant receivers available with 8, 16 or 32 inputs connected to LMU
- Panic button on Motorola vehicle radio or portable reported to LDE
- Panic button in vehicle connected to LMU cellular modem





## Conclusion

CompassCom provides a robust, flexible and agile Enterprise AVL solution. The CompassCom AVL solution is a proven, scalable and secure architecture that has been deployed for thousands of vehicles. These vehicles include private industries as well as all sectors of the government worldwide. CompassCom is confident that the service and support provided to the City of Rochester both during implementation and after system sign-off will surpass your expectations. Please contact CompassCom for additional information or to discuss any part of this proposal. Thank you.